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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

VIRGINIA BARTOW

FOR THE

Degree of Doctor of Philosophy

Wednesday, May 16, 1923, 3:30 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor F. W. Tanner
Doctor E. K. Carver
Professor W. H. Rodebush
Professor G. D. Beal

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Bacteriology
Second Minor Subject: Physical Chemistry

Thesis: AN ATTEMPT TO PREPARE AN ALIPHATIC B-DIAZO COMPOUND

SUMMARY

The alpha alkyl derivatives of acetoacetic ester chosen to prepare the beta amine for diazotization made substitution in the beta position extremely difficult.

The beta oxime prepared from diethyl acetoacetic ester could not be reduced to the beta amine.

The beta ketonic group in diethyl acetoacetic ester could not be reduced by hydrogen under diminished pressure.

Reduction of diethyl acetoacetic ester by nascent hydrogen gave the hydrolysis products but dimethyl acetoacetic ester gave the beta hydroxy acid.

Substitution of halogen for the beta hydroxyl group and subsequent conversion to the amine gave products that could not be purified.

EDUCATIONAL CAREER

A.B., Vassar College, 1918.

A.M., University of Illinois, 1921.

Assistant in Chemistry, Goucher College, 1918-1920.

Scholar in Chemistry, University of Illinois, 1920-1921.

Graduate Student in Chemistry, University of Illinois, 1920-1923.

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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WILLIAM WERT BAUER

FOR THE

Degree of Doctor of Philosophy

Thursday, May 17, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Doctor C. S. Marvel
Professor W. H. Rodebush
Doctor E. K. Carver
Professor F. W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Bacteriology

Thesis: ARSENATED DIPHENYL AND DERIVATIVES

SUMMARY

1. Benzidine has been tetrazotised and the amino groups have been replaced by arsonic acid radicals.

2. Substituted benzidines such as the dinitro derivatives have been arsenated and the dinitro diarsonic acids have been reduced to the corresponding diamino compounds.

3. A number of derivatives of these diamino diarsonic acids have been prepared, among which are azo dyes of the Trypan Blue type.

4. Derivatives of diphenyl in which an arsonic acid radical is attached to one ring and various substituted groups attached to the other ring, have been prepared.

EDUCATIONAL CAREER

B.A., Ohio State University, 1917

M.S., Ohio State University, 1918.

Research Chemist on War Gases, 1918-1919.

Research Chemist for Du Pont Company, 1919-1921.

Social Hygiene Board Fellow, University of Illinois, 1921-23.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WALDO BRIGGS BURNETT

FOR THE

Degree of Doctor of Philosophy

Monday, May 21, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Doctor E. K. Carver
Professor S. A. Braley
Professor V. E. Shelford

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Zoology (Animal Ecology)

Thesis: THE RELATION BETWEEN PHYSICAL PROPERTIES AND PHYSIOLOGICAL ACTION OF CERTAIN LOCAL ANESTHETICS

SUMMARY

1. Two series of di-alkyl amino ethyl and di-alkyl amino propyl p-aminobenzoate monohydrochlorides have been prepared:

(a) β Di-n-butylaminoethyl p-Aminobenzoate Monohydrochloride.

(b) β Diisobutylaminoethyl p-Aminobenzoate Monohydrochloride.

γ Diisobutylaminopropyl p-Aminobenzoate Monohydrochloride.

(c) β Butylallylaminoethyl p-Aminobenzoate Monohydrochloride.

γ Butylallylaminopropyl p-Aminobenzoate Monohydrochloride.

2. The anesthetic action of these esters has been tested on goldfish and relative values have been secured.

3. The anesthetic action and structure of these compounds have been correlated.

EDUCATIONAL CAREER

A.B., Southern Methodist University, 1919.

M.S., University of Illinois, 1921.

Half-Time Assistant in Chemistry, University of Illinois, 1920-1922.

Fellow, University of Illinois, 1922-1923.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

MAYOR FARTHING FOGLER

FOR THE

Degree of Doctor of Philosophy

Monday, May 21, 1923, 3:30 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Doctor C. S. Marvel
Doctor E. K. Carver
Professor E. J. Townsend

OUTLINE OF STUDIES

Major Subject: Chemistry (Physical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Mathematics

Thesis: THE HEAT OF VAPORIZATION OF METALS

SUMMARY

1. Verification of the theoretical calculations of the entropy of a monatomic gas and the rate of evaporation of a monatomic liquid make accurate experimental data on the heat of vaporization very desirable.

2. Several forms of apparatus are described which were used in attempting these measurements. A final form of apparatus is given with which very accurate results were obtained for Mercury.

3. Results were obtained for Cadmium for which no very high degree of accuracy is claimed.

4. It is pointed out that these results confirm other experimental data and give added weight to the validity of several theoretical formulae.

EDUCATIONAL CAREER

B.S., University of Illinois, 1920.
M.S., University of Illinois, 1921.
Assistant in Chemistry, University of Illinois, 1920-1922.
Fellow in Chemistry, University of Illinois, 1922-1923.

PUBLICATIONS

The Structure of Disalicyl Aldehyde. (With Roger Adams and C. W. Kreger). J. Amer. Chem. Soc., 54:1126, 1922.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

JOHN HALL GARDNER

FOR THE

Degree of Doctor of Philosophy

Tuesday, May 22, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Doctor C. S. Marvel
Doctor E. K. Carver
Professor W. F. Schulz

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE SYNTHESIS OF TRIHYDROXY METHYL ANTHRAQUINONES

SUMMARY

1. The substituted o-benzoyl benzoic acids obtained by the condensation of 3:6-dimethoxy phthalic anhydride and the methyl ethers of o-, m-, and p-cresol have been prepared and their conversion into trihydroxy methyl anthraquinones studied. The phthalein ethers obtained as by-products in the first condensation have been isolated and their structures determined.

2. It has been shown that the ketonic carbonyl assumes the position para to the methoxy group of the cresol ether residue.

3. The condensation of hemipinic anhydride with o-cresol has been studied, and the combination has been found to take place with the carbonyl in the ortho position to the methoxy group of the anhydride.

4. 1:7:8-trihydroxy-2-methyl anthraquinone was obtained from the last reaction product, and was found not to be identical with the natural dyestuff morindone.

EDUCATIONAL CAREER

B.S., Case School of Applied Science, 1919.

M.S., University of Michigan, 1921.

Graduate Assistant, University of Illinois, 1921-1922.

Fellow in Chemistry, University of Illinois, 1922-1923.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

WALTER FRIEDRICH GOEBEL

FOR THE

Degree of Doctor of Philosophy

Tuesday, May 22, 1923, 3:30 p. m.
Room 162, Chemistry Building.

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. C. Rose
Doctor C. S. Marvel
Professor M. T. McClure
Professor S. P. Lamprecht

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Philosophy

Thesis: DERIVATIVES OF CAMPHORONIC ACID

SUMMARY

1. Monoethylcamphoronate has been prepared by the direct esterification of camphoronic acid.

2. Anhydrocamphoronic acid has been prepared in quantitative yields.

3. Monoethylcamphoronate reacts with ammonia to form an imide.

4. Anhydrous ammonia reacts with alpha anhydrocamphoronyl chloride to give first an amide and then an imide by rearrangement.

5. Anhydrous ammonia reacts with beta anhydrocamphoronyl chloride in a similar manner to give an isomeric imide.

6. Anhydrous ammonia reacts with alpha bromoanhydrocamphoronyl chloride to give a bromo imide.

7. Sodium hypobromite, when treated directly with the reaction product of anhydrous ammonia and alpha anhydrocamphoronyl chloride, or beta anhydrocamphoronyl chloride, or alpha bromoanhydrocamphoronyl chloride, or disodium ethylcamphoronate fails to yield the corresponding amino acid. In each case an imide is formed.

8. A complete polariometric study of the derivatives of camphoronic acid prepared in these researches has been made.

EDUCATIONAL CAREER

A.B., University of Illinois, 1920.

A.M., University of Illinois, 1921.

Scholar in Chemistry, University of Illinois, 1920-1921.

Fellow in Chemistry, University of Illinois, 1921-1923.

PUBLICATIONS

Catalysis of the Formation and Hydrolysis of Acetamide by Acetic Acid. (With W. A. Noyes). J. Am. Chem. Soc., XLIV, 2286-2295 (1922).

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

GEORGE DEWITT GRAVES

FOR THE

Degree of Doctor of Philosophy

Wednesday, May 23, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. C. Rose
Professor B. S. Hopkins
Professor W. E. Burge
Professor C. T. Knipp

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Physics

Thesis: THE SYNTHESIS OF TRIHYDROXY-METHYL-ANTHRAQUINONES

Summary

1. An outline is given of the naturally occurring hydroxy-methyl-anthraquinones.

2. Since but few of these compounds have been synthesized, and not all have been assigned definite structures, work was undertaken which would lead to the synthesis of isomeric hydroxy-methyl-anthraquinones, and, it was hoped, to some of the natural substances.

3. The Friedel-Crafts reaction, by which phthalic anhydride is condensed with benzene derivatives to give substituted benzoyl-benzoic acids, which may in turn be dehydrated by sulfuric acid to give anthraquinones, was applied to:

(a) Phthalic anhydride and methyl resorcinol, yielding through the above steps, 1-3-dihydroxy-4-methyl-anthraquinone. This substance is not identical with the natural product rubiadin, which had been given this structure because of its color reactions and oxidation products.

(b) 3-6-Dimethoxy phthalic anhydride and the three cresols, yielding the three corresponding trihydroxy-methyl-anthraquinones. The intermediate benzoyl-benzoic acids and the phthalein by-products were identified in each case.

(c) 3-5-Dimethoxy phthalic anhydride and m-cresol, obtaining the corresponding benzoyl-benzoic acid. This with sulfuric acid should be converted to 1-6-8 trihydroxy-3-methyl anthraquinone, a structure assigned to the natural drug emodine. The yields were very small. Mixed melting point determinations and absorption spectra comparisons, however, indicate the identity of the natural and synthetic products.

EDUCATIONAL CAREER

B.S., Washington University, 1920.

M.S., Washington University, 1921.

Monsanto Fellow in Chemistry, Washington University, 1920-1921.

Graduate Assistant in Chemistry, University of Illinois, 1921-1922.

Du Pont Fellow in Chemistry, University of Illinois, 1922-1923.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION
OF
WENDELL HORACE GRIFFITH
FOR THE
Degree of Doctor of Philosophy

Saturday, May 26, 1923, 9:00 a. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor W. C. Rose
Professor Roger Adams
Professor W. H. Rodebush
Professor W. E. Burge
Professor F. W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Physiological)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physiology

Thesis: THE SYNTHESIS OF HIPPURIC ACID IN THE ORGANISM OF THE RABBIT

Summary

1. A study has been made of the rate of excretion of hippuric acid in rabbits after the oral and intravenous administration of sodium benzoate.

2. The rate of excretion of hippuric acid was found to be strikingly increased by the administration of glycine with sodium benzoate.

3. This increased rate of synthesis of hippuric acid was probably due to the presence in the organism of a large amount of preformed glycine, since it was shown not to be the result of a faster rate of absorption of benzoate from the intestine, or of a more rapid rate of excretion of hippuric acid by the kidneys, or of a stimulation of general metabolism.

4. Other amino acids, alanine, cystine, leucine, norleucine, isovaline, and aspartic acid did not increase the rate of synthesis of hippuric acid when administered with the benzoate. Similar negative results were obtained with glycollic acid, glycol aldehyde, glucose, urea, and sodium acetate. Hence, it was considered probable that none of these substances is a readily available precursor of glycine.

EDUCATIONAL CAREER

B.S., Greenville College, 1917.

M.S., University of Illinois, 1919.

Scholar in Chemistry, University of Illinois, 1917-1918.

Chemist, Sanitary Corps, U. S. A., 1918-1919.

Instructor in Physics and Biology, Sterling College, 1919-1920.

Assistant in Chemistry, University of Illinois, 1920-1922.

Instructor in Physiological Chemistry, University of Michigan, 1922-1923.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RUSSELL LEWIS JENKINS

FOR THE

Degree of Doctor of Philosophy

Wednesday, May 23, 1923, 3:30 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Professor B. S. Hopkins
Professor S. A. Braley
Professor C. T. Knipp

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physics

Thesis: THE RELATION BETWEEN PHYSICAL PROPERTIES AND PHYSIOLOGICAL ACTION OF CERTAIN LOCAL ANESTHETICS

SUMMARY

1. The series of compounds, possessing local anesthetic action, were synthesized:

(a) β di-n-propylaminoethyl p-aminobenzoate monohydrochloride
  β di-iso-propylaminoethyl p-aminobenzoate monohydrochloride
  β di-sec-butylaminoethyl p-aminobenzoate monohydrochloride
(b) γ diethylaminopropyl p–aminobenzoate monohydrochloride
  γ di–n–propylaminopropyl p–aminobenzoate monohydrochloride
  γ di–iso–propylaminopropyl p–aminobenzoate monohydrochloride
  γ di–sec–butylaminopropyl p–aminobenzoate monohydrochloride

2. Certain physical properties of these esters were studied and compared.

3. Conclusions were drawn as to the relation between these physical properties and the anesthetic activity.

EDUCATIONAL CAREER

B.S., University of Pittsburgh, 1920.

M.S., University of Illinois, 1921.

Research Assistant in Chemistry, University of Illinois, 1921-1923.

Carr Fellow in Chemistry, University of Illinois, 1922-1923.

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UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

RALPH JENNINGS KAUFMANN

FOR THE

Degree of Doctor of Philosophy

Thursday, May 24, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. C. Rose
Professor G. D. Beal
Doctor E. K. Carver
Professor W. S. Bayley

Outline of Studies

Major Subject: Chemistry (Organic)
First Minor Subject: Physiological Chemistry
Second Minor Subject: Geology

Thesis: A COMPARISON OF THE REACTIVITY OF THE CYANO GROUP IN ALKYL CYANIDES AND ALKYL THIOCYANATES

Summary

1. Organic thiocyanates were condensed with resorcinol and phloroglucinol to give imido thiol ester hydrochlorides, just as in the Hoesch reaction, organic cyanides and certain phenols condense to give ketimide hydrochlorides. The hydrochlorides were converted into the free imido thiol esters; they were also hydrolyzed to the thiol esters, which were in turn saponified to carboxylic acids of known structure. Several bis (p-nitro benzoyl) alkyl thiol β-resorcylate esters were prepared; also two imido thiol ester sulfates.

2. By boiling the imido thiol esters with anhydrous alcohols, it was possible to replace the mercapto, (-SR), group by the alkoxy, (-OR), group. These imido esters were then hydrolyzed to carboxylic acid esters of known structure.

3. Methods were developed for the preparation of two new intermediates, namely, n-butyl thiocyanate and ethyl β-resorcylate.

EDUCATIONAL CAREER

A.B., Oberlin College, 1918.

A.M., Oberlin College, 1918.

Research Chemist, Jackson Laboratory, E. I. du Pont de Nemours and Co., Dye Works, Deepwater, N. J., June 21, 1918, to September 1, 1920.

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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

KATHARINE OGDEN

FOR THE

Degree of Doctor of Philosophy

Friday, May 25, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Doctor C. S. Marvel
Doctor E. K. Carver
Professor F. W. Tanner

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Bacteriology
Second Minor Subject: Chemistry (Physical)

Thesis: CINCHOPHEN DERIVATIVES CONTAINING ARSENIC. ARSENIC DERIVATIVES OF THE DIPHENYL SERIES

SUMMARY

1. The arsonic acetophenones have been prepared and condensed with isatin and methylisatin giving arsonic acid derivatives having the general structure of cinchophen and neocinchophen.

2. The esters and arseno derivatives have been prepared from the arsonic acids. Preliminary investigations of the therapeutic value of the compounds are encouraging.

3. A study of arsenic derivatives of the diphenyl series has been made, using tolidine as the initial substance.

EDUCATIONAL CAREER

A.B., Vassar College, 1918.

Chemist, Synthetic Organic Chemistry Laboratory, Eastman Kodak Company, 1918-1920.

Graduate Student in Chemistry, Cornell University, 1920-1921.

Graduate Student in Chemistry, University of Illinois, 1921-1922.

Fellow in Chemistry, University of Illinois, 1922-1923.

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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

CHARLES HEMAN PEET

FOR THE

Degree of Doctor of Philosophy

Friday, May 25, 1923, 3:30 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Doctor C. S. Marvel
Doctor E. K. Carver
Professor W. E. Burge

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Physiology

Thesis: THE RELATION BETWEEN PHYSICAL PROPERTIES AND PHYSIOLOGICAL ACTION OF CERTAIN LOCAL ANESTHETICS

SUMMARY

1. A series of para-amino-benzoates of certain amino alcohols were synthesized:

(a) Para-aminobenzoyl dimethylaminoethanol and -propanol hydrochlorides,

(b) Para-aminobenzoyl dinormalamylaminoethanol and -propanol hydrochlorides,

(c) Para-aminobenzoyl diisoamylaminoethanol and -propanol hydrochlorides.

2. A comparative study of the physical properties of these esters was made.

3. Certain generalizations as to the relationship existing between physical properties and physiological action were pointed out.

EDUCATIONAL CAREER

A.B., Hope College, 1914.

M.S., University of Illinois, 1921.

Graduate Assistant in Chemistry, University of Illinois, February, 1920-June, 1922.

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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

PHILIP KELSEY PORTER

FOR THE

Degree of Doctor of Philosophy

Monday, May 28, 1923, 2:00 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor Roger Adams
Professor W. H. Rodebush
Professor S. A. Braley
Doctor E. K. Carver
Professor E. B. Paine

OUTLINE OF STUDIES

Major Subject: Chemistry (Organic)
First Minor Subject: Physical Chemistry
Second Minor Subject: Electrical Engineering

Thesis: DERIVATIVES OF ISOCAMPHOLACTONE

SUMMARY

1. When isocampholactone is heated with moderately strong nitric acid the two main products formed are nitroisocampholactone and a lactone acid. This lactone acid gives an amide which, on treatment with sodium hypobromite is converted to a ketone acid. This ketone acid, on treatment with methyl magnesium iodide, regenerates isocampholactone and also forms another acid which is probably a trans-hydroxy acid such as might be expected. This series of reactions demonstrates that isocampholactone contains methyl groups in the 1,2,3, positions.

2. Two moles of the Grignard reagent reacts with certain γ-keto acids to form the corresponding lactone with as good yields as that obtained from the ester. Isocaprolactone and the lactone of γ-methyl-γ-hydroxyhexanoic acid were prepared from levulinic acid.

3. Nitroisocampholactone, on treatment with alkali gives, almost quantitatively, acetone and an acid containing six carbon atoms.

4. The nitro group in the above acid is secondary as proved by the nitrous acid test and by the preparation of the sodium salt of the enolic form of the nitro group. This test and these reactions prove that the nitro acid is a cyclobutane derivative and should be called 2-nitro-1-methyl cyclobutane-carboxylic acid.

EDUCATIONAL CAREER

A.B., Grinnell College (Iowa), 1918.

A.M., University of Illinois, 1921.

Graduate Assistant in Chemistry, University of Illinois, 1919-1920.

Assistant in Chemistry, University of Illinois, 1920-1921.

Research Assistant in Chemistry, University of Illinois, 1921-1923.

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1923

UNIVERSITY OF ILLINOIS

THE GRADUATE SCHOOL

FINAL EXAMINATION

OF

THOMAS ADAM WILSON

FOR THE

Degree of Doctor of Philosophy

Monday, May 28, 1923, 3:30 p. m.
Room 162, Chemistry Building

Committee in Charge:

Professor W. A. Noyes, Chairman
Professor W. H. Rodebush
Professor Roger Adams
Professor J. H. Reedy
Doctor C. S. Marvel
Doctor E. K. Carver
Professor Jakob Kunz

OUTLINE OF STUDIES

Major Subject: Chemistry (Physical)
First Minor Subject: Organic Chemistry
Second Minor Subject: Physics

Thesis: THE TOTAL AND PARTIAL VAPOR PRESSURES OF AQUEOUS AMMONIA SOLUTIONS

SUMMARY

The object of this investigation has been to obtain experimental data on the total and the partial vapor pressures of aqueous ammonia solutions up to the limit of 12 atmospheres total pressure.

1. The total vapor pressures of 9 solutions between the limits of pure water and anhydrous ammonia have been measured between 0° and 100° C.

2. 47 determinations of the partial vapor pressures of ammonia and water vapor have been made so that the partial pressure values could be determined for the whole range covered by the total pressure measurements.

3. A complete series of tables for both the total and partial pressures has been prepared, and various relations between the variables involved have been shown graphically.

4. A bibliography on the subject of methods of partial pressure determination has been compiled.

5. The relation of this work to the absorption process of ammonia refrigeration is discussed.

EDUCATIONAL CAREER

A.B., Syracuse University, 1919.

M.S., University of Illinois, 1921.

Assistant in Chemistry, Syracuse University, 1919-1920.

Assistant in Chemistry, University of Illinois, 1920-1922.

Fellow in Chemistry, University of Illinois, 1922-1923.

PUBLICATION

The Ionization Constant of Hypochlorous Acid. Evidence for the Amphoteric Ionization, (with W. A. Noyes). J. Am. Chem. Soc., 44, 1630, (1922).